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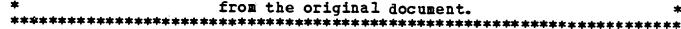
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#### ABSTRACT

Examines the effects of a one-day Department of Energy sponsored workshop on the energy conservation attitudes of four groups (N=60) of science teachers (K-8). Content included information in the area of energy resources and energy education. Information was presented in the form of mini-lectures, slide presentations, discussions, demonstrations, and hands-on activities. A pre/post 24 item Likert-type instrument was utilized with items categorized into the following groups: (1) Business/Industry: (2) Government: and (3) Personal/Individual. Significant changes in overall pre/post scores occurred across the board. It was concluded that workshops of this type can cause "positive" shifts in participants attitudes toward energy related attitudes. (DS)



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THE EFFECTS OF A ONE-DAY ENERGY WORKSHOP ON SCIENCE TEACHERS' ATTITUDES TOWARD ENERGY-RELATED TOPICS

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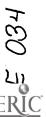
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# THE EFFECTS OF A COMEDAY ENERGY WORKSHOP ON SCIENCE TEACHER'S AT A COMED ENERGY-RELATED TOPPICS

### Objectives:

The primary purpose of this investigation was to examine the effect of a one-day Department of Energy seasoned institute on the changes in scenario teachers' attitudes to another may conservation. A second purpose of this study was to identify and enable attitude changes associated with these major components (business/industry, government, and personal) of conservation which may be preceived by an individual as having an impact on energy conservation programs.

Four groups of teachers merticular in the study, and for each groups the profile was elimined in terms of the families well hypotheses:

- I. The is no significant difference in the mean water of the teacher's overall pre and cost test some.
- 2. There is no significant of the mean walke of the teachers and post the mean "business/industry."
- There is not significant the ference in the mean value of the teacher's are and post is and scores for "government."
- 4: here is no significant difference in the mean wine of the
- 5. There is no significan will reserve in the mean walke of the tracher's pre and post is sores for the statement, "The energy corisis is over."
- 5. There is no significant stifference in the mean value of the teacher's pre and post the scores for the statement, "We should launch national programs to find new types of energy sources."

### Procedures:

specific instruction in the area of energy education for elementary and junior high science teachers. Teachers in these workshops errors prouped according to the grade level at which they the Workshop I, Kand grade; Workshop II, 3rd and 6th grades; Workshop IV, 7th and 8th grades.



The stated purposes of the workshops were: (1) to provide elementary and junior high science the activities the activities that would be actively applied in their science classrooms.

The format of each workshop was similar and included lectures, slide presentations, discussions, demonstrations, and hands-operativities. Several games such as Energy Quest were introduced and projects such as solar cookers were initiated. The consent included an inistorical perspective of energy development (with an emphasis on personal energy policy, energy resources and demands, home meating, and personal energy esage.

Each school district in our Mercon was inwrited to send one participals to each workshop. The selection of teachers was made by parincipals the other school administrators.

the initial and terminal activity of each workshop. The statements on the instrument were categorized into times areas (spin-groups) as follows:

(1) Business/Industry, (2) Government, and (3) Personal/Individual. Changes in attitude as measured by these sub-groups were analyzed using a correlated t-test, and it was then possible to determine the relative impact of each sub-group on resulting changes in attitude.

Because of the comprehensive nature of statements eleven and twenty, it was determined that they would be analyzed separately as indicated by hypotheses five and six.

#### Results:

Correlated t-tests were used in the analysis of the pre and post test scores, and as one can see from Table 1, the changes in overall attitude were



Table 1. Summary of correlated t-test values derived from a 24-item Likert-type instrument designed to measure general attitude shifts as well as shifts for each of three sub-sets of statements.

	Overa			s/Industry	Govern		Personal/Individual		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
			ı	Vorkshop I (	N=12)				
$\overline{X}$	8 <b>7</b> .50	91.42	25.42	25.92	31.58 34.92		27.50	30.58	
s	7.23	4.92	2.78	2.06	3.23 2.31		2.81	2.94	
r	0.476		0.371		0.299 0.578				
t	<del>-3</del> .67		-0.62		-3.43		-4.04		
p	D.0039		0.5520		0.0057		0.0022		
			h	orkshop II	(N=14)				
$\overline{\chi}$	85.43	93.79	24.71	26.21	32.50	35.47	28.21	32.00	
s	3.96	3.47	2.23	2.01	2.53	2.34	2.55	2.45	
r	0.383		0.495		0.596	0.596		.604	
t	-7.77		-2.62		-5.22		-6.37		
p	0.0000	0.9000 0.0201 0.0003				0.0001			
			W	orkshop III	(N=20)			- 10	
X	84.70	95.65	24.35	<b>2</b> 1, 95	32.70	32.70 36.25		32.45	
S	9.33	6.67	3.05	3.38	4.29	3.45	3.53	1.99	
r.	-0.185		0.436		-0.393	-0.393		-0.014	
t	-3.94		-3.40		-2.45	-2.45		-5.27	
p	0.0012		0.0033		0.0228		0.0001		
				orkshop IV	(N=12)			· ·	
$\overline{X}$	85.00	91.58	25.08	27.25	32.33	34.42	27.58	29.92	
S	4.71	7.04	2.97	3.93	2.67	3.45	2.86	4.14	
r	0.804		0.675	•	0.644		0.653		
t	-5.31		-2.57		-2.69		-2.57		
. <b>p</b>	0.0004		0.0248		9.0200		0.0248		

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Table 2. Summary of correlated t-test values derived from responses to statements number 11 and 20 of a Likert-type instrument designed to measure attitudes with respect to energy-related topics.

Tanahania Curis	Pre-test			Post-test				la de la compansión de la				
Teacher's Grade Level	N*	x	s	$\overline{x}$	S	r	t-walue	Level of signifficance				
Statement 11												
K-2	11	4.25	0.45	4.50	0.52	.19	T_34	.1				
3–4	14	4.50	0.52	4.86	0.36	.36	2.62	_02				
5-6	20	4.55	0.60	4.95	0.22	.21	3.00	<b>_1095</b>				
7-8	12	4.25	0.87	4.58	0.51	.46	1.46	1				
					<del>-</del>							
			State	ement 20	1		,					
K-2	11	4.55	0.52	4.82	0.40	.52	1.94	.795				
3–4	14	4.57	0.51	4.71	0.47	.41	0.98	.7				
5–6	20	4.56	0.94	4.96	0.22	.14	1.92	£				
7-8	12	4.67	0.49	4.42	0.67	.18	-1.15	л				
5-6	20	4.56	0.94	4.96	0.22	.14	1.92	Æ				

<sup>\*</sup>Some of the participants did not properly complete the attitude survey, and hence, the sample size does not equal the number of participants.

very significant for each of the groups of teachers. Also from table 1, it can be seen that a significant change in attitude for each of the three sub-sets (Business/Industry, a crossent, and Personal/Individual) occurred in all of the groups with the propertion of the business/industry sub-score in workshop —

correlated to test and test of statement number eleven (The energy cris's is over.) and tement content to (We should launch national programs to find new energy sources.) is stated in table 2. It may be seen that 11 but one of the groups shifted their attitude concerning these two issues on a "positive" direction; thosever, porly 50% of the shifts were statistically significant (It level) or quarteer).

## Discussions and Conclusions:

One conclusion is that significant changes in attitude occur as a result of participation in a workshop such as the one described in this paper. This finding is separated by Fazio and Dunlop (1) and Dunlop (2) who reported cognitive and titudinal gains for several groups of individuals were "exposed" to resentations which used the Department of Energy's Citizen's Workshop as the basis for the instruction.

Since attackinal changes relating to the sub-sets of business/industry, government, and somal/individual were all similar and significant (sine exception was the sub-set of business/industry for workshop I), it appears that the overall change in attitude was not the result of just one subset. In other words, the participants changed their attitudes in a similar manner toward all three subsets examined. This suggests that a workshop such as the one conducted will be equally valuable in changing teachers' attitudes toward business/industry,



government, and personal/individual responsibilities for emergy conservation.

As mentioned in the results and as can be seen from table 2, all but one of the groups demonstration a positive shall in their attitude with respect to statements 11 and 20; hence, only the shifts were statistically significant (.05 level or plater). It should be noted that all of the groups indicated a very positive attitude on the spectrum. It should be recluded further attitude on the spectrum.

Although this is emphasizing the attitudinal changes which occur as a result of particulation in an energy workshop, the cognitive domain cannot be ignored. This is cause attitudes are, in part, shaped by knowledge.

Rokeach (3) defines and a relatively enduring organization of beliefs around an objector sizuation pre-disposing one to respond in some preferential manner. Further attitude has three comments: cognitive (knowledge about the object or situation), affective (a tenderary to take a position or negative position toward see object or situation), and behavioral (an observable action with respect to the attitude, object or situation).

Since it is impossible to totally separate attitudes from knowledge, it is reasonable to assume that at least part of the attitudinal changes which were described in this study can be attributed to increases in content knowledge and/or a better understanding of the situation.

Nelson (4) indicates that education is the most effective means available to us of changing values and attitudes to create a new environmental citizenship. Whiting (5) also discusses the importance of education and knowledge as part of the energy situation.

Studies such as this lend strong support to the leadership position which science educators can effectively assume in helping to solve the world's energy crisis.



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